Global ionospheric TEC Changes Monitored by GPS Network During Nov/93 Storm

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The evolution of the ionosphere during the magnetic storm of November 1993 has been recorded by 40-t GPS stations. Using these data we have generated continuous, high resolution global ionospheric Total Electron Content (TEC) maps. The percent TEC changes of the storm time relative to the quiet time have also been calculated and visual displays have been produced.

ionospheric TEC has a sudden global increase. at 00 UT of Nov. 4 in the beginning of the magnetic storm main phase. 'I'he increase quickly becomes significant (> +100% relative to quiet time) and broad (from afternoon to pre-midnight in the region 60 °N-70°N, geomagnetic latitude and at noon in the region 40°S. At 04-05UT), the north hemispheric peaks have extended to all local time sectors except pre-dawn. The southern hemisphere also has sporadic increases between 20°S and 40°S. Strong increases appear in the northern auroral oval region (~60°N) in all nightside regions between 08 and 12UT. At 13UT the. positive phase ends and the negative phase begins in the daytime sector in the region of 50°N - 70°N. The TEC decrease re.aches a minimum (-80%) at18U I-J' and then spreads to al ltime sector in the northern hemisphere at 21 UT. The negative phase. seems to last to 21 UT of November 6. However, the global '1'1 3C decrease appears again at 05UT of Nov. 7 and 14UT of Nov. 8 respectively. This is probably associated with some small storms. It is not until Nov. 10, that the ionosphere completely recovers. in summary, this is a standard ionospheric storm with positive phase followed by a negative phase, and a slow recovering phase. The details of the global dynamics and physical mechanisms till need to be studied.

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